



ENERGY TRANSITION: THE FUTURE OF PETROLEUM INDUSTRY

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ABSTRACT

The petroleum industry has always changed and caused changes not only in the industry but also in the societies in which it operates. The fall in the oil prices in the second half of 2014. can be qualified as the significant event which brought to an end a four-year price stability around \$105 per barrel.

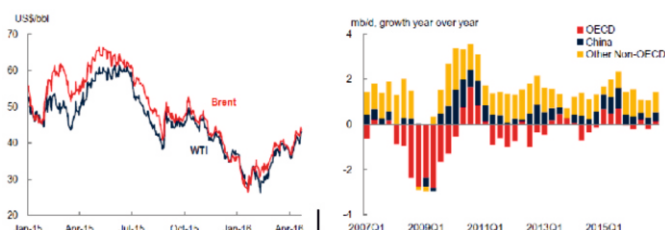
The changes that industry and we are facing now require long-term responses from the governments and political structures. Those who are responsible need to try to understand what is happening now and how it may affect the future, they have to explain and establish their strategies clearly and to adapt to new situation. Clear and stable legislative frameworks are needed to ensure financial predictability for markets to develop and for industry to provide solutions to rising global energy needs. The future of petroleum industry, both on global and national level should be strategically discussed and shaped in form of scenarios in order to meet the requirements and challenges of energy supply, energy security and energy demand increase.

1. Introduction

We live in a world which is extremely exciting, dynamic and aggressive. We have never been more connected, linked with more and more people enjoying better health, lives and living circumstances. The quality of our lives depends on reliable, accessible hydrocarbon and generally, energy system, in order to have power for our homes, to be able to travel by public transportation, to have fuel for our cars and even to have the most innovative touchscreen on our phones. We have been in a great progress but in the same time, we have to face some global challenges in the field of energy. Meeting these challenges requires a vision to certain extent and acceptable realism, urgency and long-term strategic thinking mainly by the policymakers and governments.

2. The decline of the oil price

In the second half of 2014. a highly remarkable fall of the oil prices was observed. According to Global Economic Prospects (GEP, 2015) in the period between 1984 and 2013. there were five declines of the oil price for more than 30 percent within a six month period. The price drop was in line with some major changes in the global economy and oil markets: an increase in the supply of oil and change in OPEC policy (1985-86), US recessions (1990-90 and 2001), the Asian crisis (1997-98) and the global financial crisis.



Source: GEP, 2015

2.1 The reason for decline of oil price

The conditions of supply and demand influence trends of the long-term oil prices while in the short-run the market movements. Prices may react rapidly to information published in the news even before actual changes occur. In 2014. there were some events and geopolitical conflicts in several oil producing regions, there were OPEC announcements and the appreciation of the US dollar. Long term developments in supply and demand have also played important roles in driving the recent decline in oil prices

According to Global Economic Prospects, since 2011, US shale oil production has persistently surprised on the upside, by some 0,9 million barrels per day in 2014. In the recent years the high oil price made technology of extracting oil from tight rock formations and tar sands more profitable (hydraulic fracturing and horizontal drilling). Projects which are using these technologies (unconventional) have some general characteristics: short lifecycle, which means 2-3 years from development to full extraction and relatively low capital costs. The global oil trends have been followed the trends of economic growth meaning that when the economic growth is disappointing the oil trends are downgrading. According to IEA the projected oil demand for 2015. has been decreased by 0,8 mb/d within

the period between July and December 2014 (IEA, 2015). As a result of increasing energy efficiency and the decline of oil consumption the oil intensity of global GDP has almost halved since the 1970s.

Another reason for the oil price decline may be linked with the changes in OPEC objectives. Saudi Arabia has traditionally acted as the cartel's swing producer, often using its spare capacity to either increase or reduce OPEC's oil supply and stabilize prices within a desired band. But in November 2014. OPEC failed to agree on production cuts and this event drastically changed the situation. The OPEC decision to maintain its production level of 30 mb/d revealed a significant change in the cartel's policy and its objectives in a sense they targeted an oil price band to maintaining market share.

In September and October of 2014. it became obvious that disruption of supply because of military conflict in the Middle East did not materialized as expected. In Libya, in the third quarter of 2014., despite the internal conflict the production recovered by 0,5 mb/day (about 1/2 percent of the global production). In Iraq, as the advance of ISIS stalled, it became apparent that oil output could be maintained. In addition the sanctions and counter-sanctions imposed after June 2014. as a result of the conflict in Ukraine have had little effect on oil and natural gas market.

2.3 Main political impacts

The main political implications of the recent and current oil price drop can be grouped as the implications on fiscal, monetary and structural policies. Some of the developing countries provide large fuel subsidies sometimes exceeding 5 percent of GDP (IEA). However, subsidies tend to benefit middle-income households disproportionately and to tilt consumption and production towards energy-intensive activities (World Bank, 2014). Falling oil prices reduce the need for fuel subsidies and provide an opportunity for subsidy reform with limited impact on the prices paid by consumers. Some countries like Iran, Egypt or India implemented such reform in 2013/2014. removing some of the distortions and inefficiencies associated with subsidies. fiscal resources released by lower fuel subsidies could either be saved to rebuild fiscal space lost after the global financial crisis or reallocated towards better-targeted programs to assist poor households and critical infrastructure and human capital investments.

Oil prices are expected to remain relatively low over 2016 and their impact on inflation is expected to be mainly temporary. In most cases, central banks would not need to respond to the temporary fall in inflation - unless there is a risk that inflation expectations become de-anchored. In some parts of Europe, where the inflation is rather low, several months of outright deflation could de-anchor inflation expectations. In such situation central banks could help keep inflation expectations anchored by loosening monetary policy or providing forward guidance. In oil exporting countries with flexible exchange rates central banks will have to balance the need to support growth against the need to maintain stable inflation and investor confidence in the currency.

If sustained over the medium-term, low oil prices may encourage a move towards production which is more intensive in fossil fuels or energy more generally. This runs counter to broader environmental goals in many countries. To offset the medium-term incentives for increased oil consumption, while at the same time building fiscal space, policymakers could modify tax policies on the use of

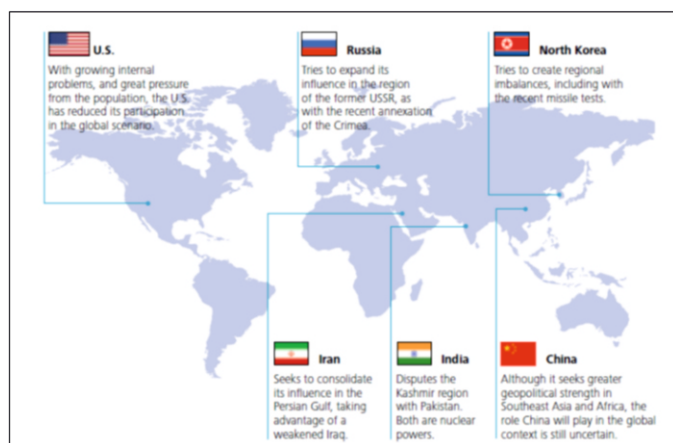
energy, especially in countries where fuel taxes are low.

For oil-exporters, the sharp decline in oil prices is also a reminder of the vulnerabilities inherent in a highly concentrated reliance on oil exports and an opportunity to reinvigorate their efforts to diversify. These efforts should focus on proactive measures to move incentives away from activities in the non-tradable sector and employment in the public sector, including encouraging high-value added activities, export in non-resource intensive sectors, and development of skills that are important for private sector employment (Gill et. al. 2014; Cherif and Hasanof, 2014a and 2014b).

3. Who will be the global leader

Since the end of the WWII the US has assumed the role of „global police“ directly or indirectly intervening in regional conflicts and putting economic and political pressure on other countries (MAP). It is not known whether this will continue to be the case in the next decades. The involvement of the US armed forces in conflicts abroad is being increasingly criticised due to the cost in resources, political strain and human lives. In the US it is still recovering from the 2007-2008 financial crises and dealing with debates on issues such as unemployment and public health. All these elements may point to the possibility of a gradual withdrawal of the US from the center of international politics.

From the economic point of view China is preparing to replace the US as the largest global economy but from the geopolitical point of view a changing of the guard is less clear.



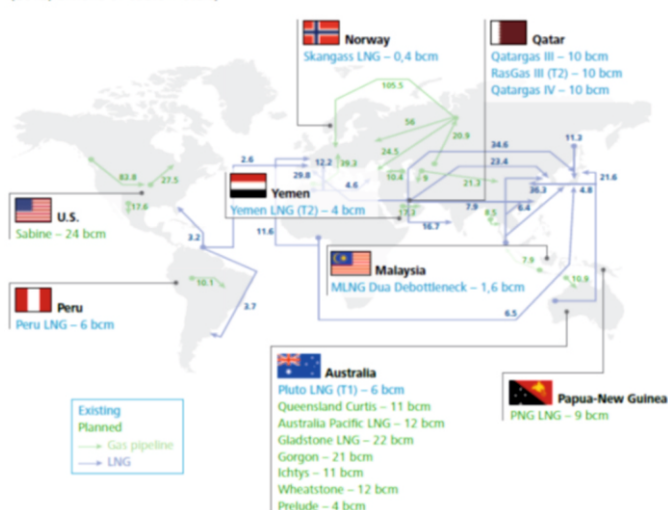
China has been seeking to ensure its hegemony in Africa and Southeast Asia but shows no signs of being willing to assume the role of global guardian. Uncertainty worsens due to persistent conflicts in neighbouring countries such as India or Pakistan. On the threshold between Asia and Europe, Russia is trying to extend its influence over the countries of the former Soviet Union; the recent annexation of the Crimea and interventions in the Ukraine demonstrate the intention. In the Middle East, Iran seeks to emerge as the main geopolitical force in the region taking advantage of the reduced influence of Iraq after the US intervention and domestic instability in other countries caused by the Arab Spring. Israel continues as in recent decade to be in constant conflict with its neighbours as an ongoing source of regional tension.

3.1 Sustainable globalization

One of the scenarios in the future energy transition may be linked with sustainable globalisation where geopolitical stability favors economic growth and trade cooperation between countries. With high demand new alternative sources of energy would add to the supply of conventional fuels. In this scenario ordered growth in the geopolitical axis and the green future in the axis of competitiveness between energy sources predominate. Within this scenario the emerging countries with favorable demographic condition would be the driven energy; India would replace China as the motor of the world. Mexico, Indonesia, Malaysia, Colombia and Brazil would come in second demanding raw materials and energy to support growth. There would be a greater demand for renewable and clean energy sources. Electric cars, solar and wind energy generation would become more popular thanks to the technological innovations and public policies of institutional support. The commitment to CO₂ emission reduction targets would increase, with more countries actively working to reduce their own problems of CO₂ pollution and emissions.

Finally, the new global liquefied natural gas (LNG) market, supported by the production boom in the US, Australia, China, Argentina and the east coast of Africa would take off. LNG would be seen as a viable and more sustainable substitute for oil with lower costs and less environmental impact, including for meeting growing demand for electricity, required by large fleets of electric cars, finally viable in terms of autonomy, performance and cost.

Flow of natural gas world trade and location of main LNG plants (2012, billions of cubic meters)



3.2 Decline of oil

Within this scenario the decline of oil is seen in the global energy matrix. It would be a world in which alternative energy sources would gain impetus with a lower demand for oil due to lower economic growth combined with technological innovations and advances in alternative sources.

China would probably slow its development and other emerging countries capable of creating new wave of dynamism would not appear. In the advanced economies, internal crises and recession would impede a return to growth. All this could lead to global stagnation with a fall in energy demand and prioritisation of cheaper sources. With lower costs and high supply natural gas would become an increasingly viable and present alternative.

Natural gas as the cleaner energy than oil represent an important component in the scenario. With growing concern about the climate change, the international community would unite to create a context more favorable for alternative fuels. Legislation restricting emission of pollutants would be strengthened, including emerging countries and the carbon credits market would consolidate.

3.3 Dominance of fossil fuels?

Alternative energy vectors would not be established as viable options and natural gas would not be commercialised through a global market. With this, sources of fossil origin would multiply which would combine with conventional oil and gas exploration to supply growing demand from the emerging economies.

Dynamism would appear in industrialising emerging countries, global political stability would provide a solid base for international cooperation, greater global exchange of goods and services and resulting acceleration of global GDP growth. With heated demand conventional oil production would continue high but new fossil sources would appear in the panorama. Unconventional oil (tight and shale oil) would gain impetus in the USA and contribute more than 50% increase in the country's production by the end of the 2040 decade. The operating challenges of exploring in deep waters and inhospitable regions (Brazilian presalt and Arctic continent) would be overcome, providing more supply to the market. Multinational expansion of oil companies in emerging countries (China, Brazil, India) and local operation of the US majors would be relevant movements.

4. Changes in the energy sector

According to recently published studies (World Energy Council, Statoil) studies the landscape of energy sector in upcoming years will be significantly different than it is approached nowadays and meeting future energy demand will be a key challenge. For instance the global population will increase from a 7 billion to approximately 9 billion by 2050. According to WEC study, the average GDP per capita and the mobility will significantly increase for more than 70%. It is expected that the global primary energy consumption will continue to rise but at a lower rate than in previous decades. Meeting global and regional energy demand will be a challenge, there is no global solution to the energy supply issue. Instead each of the individual parts of the challenge must be worked out to reach the global goal of sustainable, affordable and secure energy supply for all.

Energy efficiency and primary energy mix will increase significantly in the near future and the energy efficiency and energy conservation will be absolutely crucial in dealing with demand outstripping supply. In terms of energy mix fossil fuels will have a crucial role but due to emerging markets of India and China coal will also play very important role in the future energy mix. Oil and natural gas will remain the most popular energy sources especially from unconventional sources.

5. Conclusion

The decline in oil prices was quite significant compared with the previous episodes of oil price drops during the past three decades. There have been number of long-term and short-term drivers behind the recent plunge in oil prices: several years of large upward surprises in oil supply, some downward surprises in demand, unwinding of some geopolitical risks that had threatened production, change in OPEC policy objectives and the appreciation of the US dollar.

The decline in oil prices has significant macroeconomic, financial and policy implications and we live in a time of unprecedented uncertainty for the energy sector. The pressure and challenge to develop and transform the energy system is immense. Having in mind these facts it is obvious that the policymakers should increase the effort to establish scenarios, models and finally energy strategies in order to meet the challenges of the energy sector in the future.